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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/631,509	08/03/2000	Clyde Maxwell Guest	B-64909 (013377/0058)	9173

20594 7590 10/17/2003

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EXAMINER

BARTH, VINCENT P

ART UNIT PAPER NUMBER

2877

DATE MAILED: 10/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/631,509

Applicant(s)

GUEST ET AL.

Examiner

Vincent P. Barth

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-15 and 19-21 is/are allowed.
- 6) ☐ Claim(s) 16-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Preliminary Comments

1. In view of the Appeal Brief filed on 28 July 2003, **PROSECUTION IS HEREBY REOPENED**. Applicants' Appeal Brief tended to clarify differences between the instant invention and the prior art. Accordingly, Claims 1-15, 19 and 20 have been discussed below as containing allowable subject matter. However, new grounds of rejection and discussions of Claims 16-18 and 21 are set forth below.

To avoid abandonment of the application, Applicants must exercise one of the following two options:

- (1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,
- (2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeYong, et al., U.S. Pat. No. 6,577,757 (10 Jun. 2003).

4. Referring to Claim 16, DeYong discloses a system for image recognition in which the presence or absence of a feature on a circuit board may be determined (Fig. 1, element 166; Fig. 3, steps 256 and 258; col. 5, lns. 63-64; col. 6, lns. 21-23; col. 9, lns. 4-23). Applicant had objected to previous Office Actions in which “defects” and “features” were treated as essentially equivalent or interchangeable. The Examiner has considered these arguments, and agrees that a distinction should be drawn between locating component “features” and “defects”, in the context of the present invention. The Examiner still holds that linguistically, a “defect” is still a “feature”, albeit a defective feature of an inspection surface. However, Applicants may be their own lexicographers while drafting their Specification (citations omitted), thus allowing for such distinction to be made in the instant claims. Moreover, it is not uncommon in the art to draw such distinction between features and defects. Accordingly, every effort will be made for the remainder of the prosecution to adhere to such distinction, and any discussions regarding same will be carefully considered. Continuing now with a discussion of the Deyong reference, the system in DeYong achieves a determination of the presence or absence of a component on the

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circuit board by first viewing a blank board, and then a board populated with chips and the like (see Fig. 1, element 166; and col. 9, lns. 4-23). DeYong does not explicitly use the term “difference data” to describe the data which results in the comparison between the images from a blank board and a populated board. However, implicit in the reference is that a difference image is generated to locate the presence or absence of features/components on the board. See MPEP §2144.01. Moreover, the term “difference image” is the term more commonly used in the art to describe such a system, since digital cameras in such context has become the norm, and the general understanding is that images digitally stored represent data. Accordingly, the claimed method would have been obvious to those skilled in the art at the time of the invention.

5. Referring to Claims 17 and 18, the proposed limitation is that particular types of features, such as contact bumps or representative components, are features which are to be located in the method. However, Applicants have not established how such limitation represents a critical limitation over the prior art, in which, for example, a chip or other feature may be located (see DeYong, Fig. 1, element 166). Circuit board chips, contact bumps, or representative components or any shape size or composition should generally be within the scope of the disclosure of DeYong, unless a particular optical property of the feature would not lend itself to such methods. Accordingly, this feature would have been obvious to those skilled in the art at the time of the invention. See MPEP §2144.05(III) and §§716.02-716.02(g) for a discussion of criticality and unexpected results.

Allowable Subject Matter

6. Claims 1-15 and 19-21 are allowable, since each contains subject matter which the prior art does not teach or suggest.

7. Referring to Claim 1, the prior art references, either considered alone or in combination, do not disclose or render obvious the limitations whereby a component inspection system whereby a 2D inspection system locates feature coordinate data and a 3D inspection system receives the coordinate data and generates inspection control data therefrom, in combination with the remaining limitations in the claim. Claims 1-8 are allowable based on their dependency upon the claim from which each is dependent. Referring to Claim 9, the prior art references, either considered alone or in combination, do not disclose or render obvious the limitations whereby a component inspection system comprises processing 2D image feature location data, control data is determined for a 3D inspection of the component from the location data, and performing 3D inspection from the control data, in combination with the remaining limitations in the claim. Claims 10-15 are allowable based on their dependency upon the claim from which each is dependent. Referring to Claim 19, the prior art references, either considered alone or in combination, do not disclose or render obvious the limitations whereby a method for locating features comprises determining the placement of a 3D component based on the location of each of the one or more features, in combination with the remaining limitations in the claim. Claim 20 is allowable based on its dependency upon the claim from which it is dependent. Referring to Claim 21, the prior art references, either considered alone or in combination, do not disclose or render obvious the limitations whereby a method for locating features using the difference

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data to locate an edge of one or more of the features where brightness values of the first and second images are close, in combination with the remaining limitations in the claim.

Comments

8. As mentioned above in the section entitled Preliminary Comments, Applicants' Appeal Brief dated 28 July 2003 tended to clarify differences between the instant invention and the prior art, thereby resulting in a determination that Claims 1-15 contain allowable subject matter. The particular portion of Applicants' Appeal Brief relating to Claims 1 and 9 are as follows:

“Furthermore, the Examiner states that ‘Michael further discloses that 2D coordinate data may be generated by Golden Template Comparison (GTC) (col. 10, ln. 35) and combined with 3D data.’ [Final Rejection, page 2, paragraph 4] However, column 10, line 35 of Michael only states that ‘as another example, *further* processing including Golden Template Comparison can be perform.’ As previously discussed, Michael essentially discloses a three dimensional golden template comparison inspection process. No mention is made of generating two dimensional data at all in Michael, much less *prior* to generating three dimensional data, and of *using that two dimensional data to generate inspection control data based on feature location data*. (Appeal Brief, pg. 9, last full paragraph) (emphasis added)

The above discussion emphasizes that the prior art disclosed in the Michael reference discloses the use of 3D data *first*, and then suggests that 2D data from a Golden Template Comparison may be used in *subsequent* operations. Whereas, the instant invention uses the two dimensional Golden Template Comparison *first*, thus saving computer processing power requirements, which is only then *followed* by a more data intensive 3D analysis. However, note that although the Examiner finds the above argument persuasive taken as a whole, the statement “No mention is

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made of generating two dimensional data at all in Michael” appears to run counter to any acknowledgement that Golden Template Comparison is essentially a 2D system, and which is indeed disclosed in Michael at column 10, line 35. Nevertheless, the point is moot, since Michael does not teach or suggest using GTC or other 2D analyses to locate defects *prior* to performing more computationally intensive 3D analysis, nor does any obvious combination of Michael with another reference. Moreover, the Examiner had cited In re Burhans, 69 USPQ 330 (CCPA 1946) for the proposition that changing the order of performing steps is obvious, absent new or unexpected results. However, since the Michael reference suggest using GTC after 3D analysis, the operation suggested by Michael would not achieve the desired result of reducing computing requirements. Accordingly, the Examiner withdraws the invocation of Burhans as it might be applied to the combination of Michael and Nichani.

9. Applicants’ Appeal Brief dated 28 July 2003 contained arguments which tended to clarify differences between the instant invention and the prior art, thereby resulting in a determination of allowability. The particular portion of Applicants’ Appeal Brief relating to Claim 16 is as follows:

“[T]he process of Claim 16 is not performed to locate *defects*, but to locate *features* that are installed on the component. Golden Template Comparison causes features to be obscured, not identified – the purpose of Golden Template Comparison (as well as the invention of Nichani) is to *cause known features to disappear in the difference image*, leaving only unexpected results.” (Appeal Brief, pg. 18, first paragraph) (emphasis added)

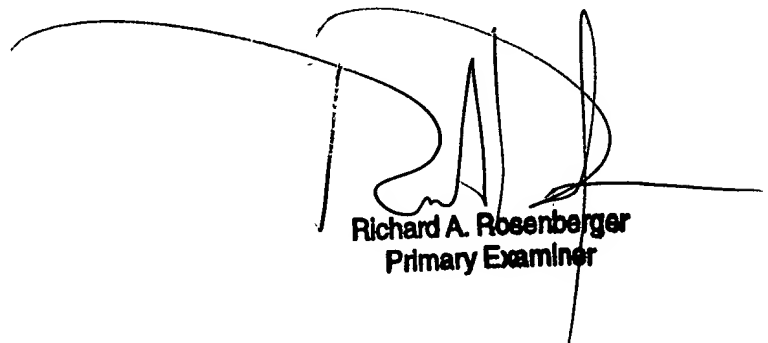
The above statement clarifies the differences between the prior art in Nichani and the instant invention. The Examiner had construed the terms “defect” and “feature” as interchangeable, in the sense that surely a defective feature (i.e. a “defect”) is, at least linguistically, still a “feature”.

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(See Office action Based on such construction and reasoning, the GTC system in Nichani would find “features”, albeit only defective features. However, based on the disclosure in the instant invention, and the above clarification in Applicants’ Appeal Brief, it seems clear that Applicants are using the term “features” to mean essentially non-defective features. In view of such construction, indeed, these non-defective features would disappear using the GTC method in Nichani, leaving only defects for inspection.

CONCLUSION

10. Applicants’ Claims 1-15 and 19-21 are allowable based on the reasons set forth above.
11. Applicants’ Claims 16-18 have been rejected, based on the reasons set forth above.
12. Any inquiries concerning this communication from the Examiner should be directed to Vincent P. Barth, whose telephone number is 703-605-0750, and who may be ordinarily reached from 9:00 a.m. to 5:30 p.m., Monday through Friday.
13. If attempts to reach the Examiner prove unsuccessful, the Examiner’s supervisor is Frank G. Font, who may be reached at 703-308-4881.
14. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.



Richard A. Rosenberger
Primary Examiner